SCH4U Stoichiometry Review

1. Balance the following chemical reaction equations.

   (a) $\_\_Fe_3O_4 + \_\_H_2 \rightarrow \_\_Fe + \_\_H_2O$

   (b) $\_\_Mg_3(PO_4)_2 + \_\_AgCl \rightarrow \_\_Ag_3PO_4 + \_\_MgCl_2$

   (c) $\_\_KClO_3 \rightarrow \_\_KCl + \_\_O_2$

2. Acetylene (C_2H_2) burns in oxygen to produce carbon dioxide, and water as products, as shown below :

   $$2\,C_2H_{2(g)} + 5\,O_2 \rightarrow 4\,CO_2 + 2\,H_2O_{(g)}$$

   a) How many molecules of water are produced if 12 mol of oxygen gas are completely consumed?

   b) How many **grams** of acetylene are needed to completely react with 95 g of oxygen ?

3. How many **moles** of chlorine gas are required to form 2.50 mol of sodium chloride **in a synthesis reaction?**

4. Calculate the volume of Oxygen measured at STP that would be released when 100. g of Mercury (II) oxide is decomposed by heat.

   $$2HgO \rightarrow O_2 + 2Hg$$

5. 40. L of hydrogen measured at 10°C and 66.6 kPa pressure are produced by the action of dilute Sulfuric acid on Zinc. Calculate the mass of Zinc required.

6. Consider the neutralization reaction: $2NaOH_{(aq)} + H_2SO_{4(aq)} \rightarrow Na_2SO_{4(aq)} + 2H_2O$

   If 50. mL of a 0.30 mol/L H_2SO_4 solution is neutralized by 25 mL of NaOH, find the concentration of the NaOH.

7. What volume of 12.0 mol/L HCl(aq) would it require to completely react with 5.00 g of Zn?

   $$Zn_{(s)} + 2\,HCl_{(aq)} \rightarrow ZnCl_{2(aq)} + H_{2(g)}$$

$R = 8.31$	$N_A = 6.02 \times 10^{23}$
$PV = nRT$	$N = n\,N_A$
$n = m / M$	$d = m / V$
$C = n / V$	$C_1V_1 = C_2V_2$